DOCUMENT RESUME

ED 207 031 CS 006 281

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TITLE Conservation as a Supplementary Predictor of Reading Skill.
PUB DATE Mar 80
NOTE 8p.; Paper presented at the Annual Meeting of the Eastern Educational Research Association (Norfolk, VA, March 5-9, 1980).

EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS Cognitive Processes; *Conservation (Concept); Correlation; Decoding (Reading); Elementary School Students; *Intelligence Quotient; Predictive Measurement; *Predictive Validity; *Predictor Variables; Reading Ability; *Reading Research; *Reading Skills; Word Study Skills
IDENTIFIERS *Piagetian Tasks

ABSTRACT

A study explored the relation between Piagetian conservation tasks, IQ scores, and reading test scores. A series of 16 items involving conservation tasks for area, length, weight, and volume were presented to 516 students in grades four through nine. The scores on these conservation items were correlated with students' scores on achievement and IQ tests in analyses by Guttman scaling and multiple regression analyses. A combination of IQ and conservation achievement scores was the best predictor in 8 out of 24 multiple regression equations, while IQ was the sole predictor in 12 out of 24 multiple regression equations. The results supported previous research by L. Whyte, indicating that maximum prediction of education test scores resulted from combining traditional IQ scores with achievement on various Piagetian tasks. Conversation achievement was most strongly related to decoding among reading skills as well as to word study skills scores from the New Jersey Minimum Basic Skills tests. (RL)

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CONSERVATION AS A SUPPLEMENTARY PREDICTOR OF READING SKILL

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Paper presented at Annual Convention of Eastern Educational Research Association, Nov. 15, 1980.

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1. Conservation as a supplementary predictor of reading skill.

2. Major objective.

This study explores the relation between conservation achievements and reading scores. Almy (1966) and Polk and Goldstein (1979) found that early preschool readers received higher conservation scores than non-readers. Kellogg (1976) also found that training in conservation led to significant increases in a variety of reading readiness skills. The present study seeks to discover the relationship between conservation achievements and reading skills in later school years when reading skills include comprehension.

3. Theoretical framework.

Psychologists and educators have believed that Piaget's theory of intelligence should provide the link for assessing cognitive readiness in educational tasks. Consequently, it is expected that use of Piagetian assessment tools will provide more specific readiness information than that provided by traditional IQ tests. Two problems have stood in the way of the use of Piagetian assessment tools. First, research demonstrating the extent and nature of the link is meager. The second problem lies in the difficulty of teachers' assessment of developmental structures through the clinical interview. More time-efficient assessment methods are needed.

4. Methods and techniques.

Piaget test composition. A series of 16 items which included many of the the traditional tasks used in Piagetian examinations of intellectual function were prepared for group presentation. Ten tasks requred concrete operations including class inclusion, additive composition, multiple classification, conservations, parallel seriation, horizontal and vertical axes, and coordination of perspective. The remaining six tasks tested formal operations.

Each item was presented by appropriate materials and a transparency projector. The examiner circulated in the room, provided specific assistance, and clarified questions about the items. Each pupil had to choose one answer from a set of four and write a justification for his choice. The examiner also read each answer and attempted to get each child's best answer.

Scoring. Each item was scored in two ways. Any choice of an incorrect answer was given a score of 0. A correct choice with inadequate justification received a 1, and correct choice and adequate justification received a 2.

5. Data source.

Four districts in central New Jersey provided 516 pupils who took the group assessment of Piagetian tasks. The children were in a variety of grades from 4 to 9. The children also had taken CAT achievement tests or the New Jersey Minimum Basic Skills (MBS) tests. An IQ (either CAT or Lorge-Thorndike) was available for each child.

6. Results and conclusions.

Analysis by Guttman scaling. The five conservation items, conservation of area, two tests of length conservation, conservation of weight and conservation of volume, were analyzed by PROCEDURE GUTTMAN of the Statistical Analysis System (1979). Of the pupils, 369 showed scalogram patterns consistent with a Guttman scale while 170 did not. The coefficient of reproducibility was .880, the minimum marginal reproducibility was .714, and the coefficient of scalability was .579. The correlations among the items were all positive, ranging from .273 to .540 and the item-total correlations were at least .394. The scale reliability was .865. These results are shown in Table 1.

Supplementary contribution of conservation to reading skill scores. A score of conservation achievements was computed by adding the number of items passed. IQ, the conservation score, and sex were used as predictors of each reading summary score using PROCEDURE STEPWISE of SAS. These analyses were performed separately for each school district and children who did or did not meet scale requirements. The results are shown in Table 2.

In general IQ was an important predictor. It was the sole predictor in 12 out of 24 multiple regression equations. A combination of IQ and conservation achievements was the best predictor in 8 equations and conservation by itself in two equations. Thus conservation supplements or predicts reading scores in almost as many equations as IQ alone is effective.

Surprisingly, there was some tendency for conservation to be the primary predictor for children who did not meet scale requirements (3 of 12) and some tendency for conservation to be the secondary predictor when children did meet scale requirements (4 of 12).

Conclusions. The present research supports Whyte's (1977) findings that maximum prediction of educational test scores results form combining traditional IQ scores and achievements on various Piagetian tasks. In the present form, however, scales of Piagetian tasks cannot replace information from traditional IQ tests.

This study and research by Polk and Goldstein (1979) suggests that conservation achievements are most strongly related to decoding among reading skills as well as to word study skills in the MBS tests. Both Kellogg (1976) and Almy (1966) have hypothesized that the relation between such decoding skills and conservation is a result of the common skills required by each--the ability to focus on more than one aspect of a situation at a time and integrate details with a whole. This relationship continues through the school years.

7. Educational implications.

There is potential usefulness for group methods of assessing the development of Piagetian sturctures, particularly when rules of standardized tests are relaxed to assure student understanding. In this test, justifications made little practical difference, much like Field (1979) who found that judgments-plus-justifications produced only insignificant differences in judging conservation achievements.

8. References.

Almy, M. Young children's thinking: Studies of some aspects of Piaget's theory. New York: Teachers College Press, 1966.

Field, D. Justifications: Another look. Paper presented at the 9th Annual Symposium of the Jean Piaget Society. Philadelphia, June, 1979.

Kellogg, D. H. Experience, conservation, reasoning, and reading readiness. In Renner et al. (eds.) Research, teaching, and learning with the Piaget model. Norman, Oklahoma: University of Oklahoma, 1976.

Polk, C. L., & Goldstein, D. Early reading and concrete operations. Paper presented at the 9th Annual Symposium of the Jean Piaget Society. Philadelphia, June, 1979.

SAS Institute. SAS Manual. Chapel Hill, North Carolina: SAS Institute, 1979.

Whyte, L. Logico-mathematical and spatial development in children underachieving in arithmetic. Alberta Journal of Educational Research, 1977, 23 (4), 280-297.

TABLE 1

GUTTMAN SCALING OF CONSERVATION TASKS

TASK	PERCENT PASS (N = 516)	ITEM-SCALE CORR	
CONSERVATION OF AREA (4)	72	.488	.587
CONSERVATION OF LENGTH (5)	86	.558	.584
CONSERVATION OF WEIGHT (7)	67	.307	.448
CONSERVATION OF VOLUME (8)	66	.544	.547
HORIZONTAL AXIS (9)	41	.394	.405
COEFFICIENT OF REPRODUCIBILITY		.880	.832
MINIMAL MARGINAL REPRODUCIBILITY		.714	.601
COEFFICIENT OF SCALABILITY		.579	.579
R_{xx}		.865	.812
Chi Square (25)		56.33	$p < .001$

TABLE 2

SIGNIFICANT SQUARED MULTIPLE CORRELATIONS FOR PREDICTING A VARIETY OF READING VARIABLES FROM IQ, SEX, AND CONSERVATION SCORES USING STEPWISE REGRESSION

VARIABLE	DISTRICT 1		2		3		4	
	Scale (N=39)	Not (N=19)	Scale	Not	Scale (N=61)	Not (N=26)	Scale (N=96)*	Not (N=53)+
CAT VOCABULARY	---	---	---	---	IQ (.419)	IQ + Cons (.538)	IQ + Cons (.375)	Cons (.248)
CAT READING COMPREHENSION	---	---	---	---	IQ (.483)	IQ (.225)	IQ (.339)	Cons + IQ (.302)
CAT LANGUAGE TOTAL	---	---	---	---	IQ (.317)	Cons + IQ (.649)	IQ + Cons (.309)	Cons + IQ (.249)
MBS READING RECOGNITION	IQ + Cons (.529)	IQ (.292)	---	---	---	---	Sex + IQ (.289)	IQ (.074)
MBS READING COMPREHENSION	IQ + Cons (.530)	IQ (.490)	---	---	---	---	IQ (.252)	IQ (.079)
MBS READING STUDY SKILLS	Cons (.679)	IQ (.163)	---	---	---	---	Sex (.172)	IQ (.231)

* N=31 for MBS tests
\+ N=23 for MBS tests